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MEDICAL AND PHYSICAL EXAMINATION OF SCHOOL CHILDREN.*

By Frederick L. Hoffman.

The results of education require to be considered in their mental, moral, and physical aspects. Heretofore the last has received but superficial consideration, and while there is a well-established relationship between the physical and the mental conditions of children, the interdependence of the two as a fundamental condition precedent to school efficiency is a principle which has only been recognized in comparatively recent times.

A vast amount of school experience is not made a matter of record, nor are the results of such observations as have been made preserved with sufficient care and utilized for practical ends. The record of the child during its school life should include a reasonably full account of the child's personal antecedents, traits, and characteristics as determined by intelligent observation or by means of accurate physical measurement. The card system lends itself better to this purpose than the recording of such facts in books of record, or on loose sheets which are easily lost or destroyed. Since a considerable amount of information is required, it seems best to adopt a triplicate card system, one card being used for the personal record, one for school attendance, and one for moral defects and delinquencies. The most comprehensive inquiry should be made at the child's entrance and the essential facts then obtained should constitute the basis of subsequent inquiries as to a possible relationship between personal traits and the results of the educational processes to which the child may be subjected.

The personal record should include the sex, date of birth, family history, a record of illness previous to school admission, whether the child is the first born, the second, the third, etc., whether the father or mother, or both, are living or dead, and any other important facts of this nature.

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The school attendance should include information as to the causes of irregularity and absence, whether due to sickness and if so the cause thereof, whether due to truancy and if so the methods of correction, etc.

The personal inspection of the child, which should be made if possible at least once a week, should include information as to clothing, foot gear, and bodily cleanliness. The information as to foot gear is of considerable practical importance on account of the close relationship of defective shoes, thin soles, etc., to the occurrence of respiratory and other diseases.

The bodily inspection, which should by preference be made by a regularly employed school physician, should include the condition of the teeth, nose, throat, the presence of glands, external diseases of the eyes, the normality or abnormality of vision, external and internal diseases of the ear, normal and abnormal hearing, disorders of speech, differentiating stammering from stuttering, mental condition, the condition of the lungs, predisposition to tuberculosis or actual presence of the disease, the condition of the heart and of the nervous system, evidence of rickets, spinal deformities, particularly spinal curvature in its incipient stage and, finally, evidences of acute infectious diseases and proof of vaccination. To these may be added the temperature in suspected cases of fever, and the blood test in suspected cases of anemia.

The anthropometric measurements should include at least the measured height, the measured weight, and the measured inspiration and expiration of the chest. These should be amplified by general observations as to the state of nutrition and physical development to determine possible definite evidences of malnutrition or underfeeding.

Foremost among the statistics which are required for an intelligent understanding of the actual conditions of school life as they relate to the school population as a whole are returns of the age distribution of pupils by sex according to grade. Only a few state reports contain information of this character, one of the best being that of the Board of Education of the State of Connecticut.

Statistical data concerning physical defects or deformities as well as statistics of proficiency, determined by the usual school methods, should conform to the classification of pupils by ages and grades.

The practical importance of this suggestion is brought out by the investigation into the physical condition of children attending public schools in New South Wales, with special reference to height, weight, and vision. It is said in that report that "of the many comparisons which the anthropometrical survey of public school children in New South Wales enables us to make, none is more interesting than that which shows the relation of the physical growth of the children to their mental development." It is shown by the tables contained in the report that the growth in physique corresponds remarkably with the progress of the children in the various school classes; and, for illustration, it is shown that the average ten-year-old boy in Class I measures 50.9 inches in height; in Class II, 51.3 inches; in Class III, 52.1 inches; in Class IV, 52.4 inches; and in Class V, 53.2 inches. The facts, therefore, warrant the conclusion that, taking a number of children of the same age, those who are best developed mentally are also those who are best developed physically, as measured by stature. A similar conclusion results from an investigation of the attained weights, and apparently the rule is well established that at any given age the higher the child's mental development the better, other things equal, will be the child's physique.

Obviously, there is an imperative need of precision in the terms used as well as uniformity in the methods of measurement employed. Inadequate statistical definitions are the chief source of error in statistical comparisons. While uniformity of procedure is difficult to secure, it is so much more a necessary requirement that the unit adopted shall be fully explained and that the method of measurement or examination made use of shall also be stated in detail. As far as practicable, only standardized medical and anthropometric apparatus should be used, for example, such as has been approved by the American Association for the Advancement of Physical Education. It makes quite a difference in height whether the measurement is taken with the shoes on or off, and it makes a considerable difference in weight whether the same is ascertained in the summer or in the winter, or without the outer garments, or in the nude. These difficulties can easily be overcome, and past experience has shown that it is possible to correctly measure, by statistical methods the influence of physical condition upon the educational progress of children at school.

Among the numerous new questions concerning which it would be of great value to have definite statistical information, as a basis for required educational reforms, I would place first of all the accurate determination of the child's visual power, including not merely visual strength but the probable degree of astigmatism. It should be stated in the reports whether the children examined wear spectacles or not, and the use of *glasses* instead of well-fitting spectacles should be absolutely prohibited, at least in school, as incompatible with the modern theory of proper adjustment and visual correction. It is seriously open to question whether teachers are fully qualified to determine more than approximately the acuteness of eyesight in school children, but it must be self-evident to anyone familiar with the facts that only a specialist in refraction work can determine accurately the occurrence of astigmatism, which is probably much more common than generally assumed. Statistical data on the subject of astigmatism require at least a differentiation of the standard or ommetropic eye, the flat or hypermetropic eye, and the elongated or myopic eye. It is the last form of eye abnormality which is apparently the most common.

The importance of accuracy in investigations of this kind is emphasized in the tabulated returns of defective vision in the treatise on "Medical Inspection of Schools," by Gulick and Ayres. These authors show that among Cleveland school children examined for defective vision, 20.7 per cent. were defective in the year 1900, but in 1907, in the well-to-do districts of Cleveland, 32.4 per cent. had defective vision, and in the congested districts, 71.7 per cent. According to the Massachusetts returns for 1907, 22.3 per cent. of the children had defective vision; and in New York City in 1906, 31.3 per cent. were of this class. Comparing the results for New York City in 1906 with those for Minneapolis in 1908, these authors show that defective vision in the former amounted to 22.8 per cent., and in the latter to 23.9 per cent., but in all of these returns no clear distinction is made between visual strength and astigmatism, which, however, is absolutely essential for practical purposes.

The Massachusetts returns for 1907 give a general average of 22.3 per cent.; in one county (Suffolk) the percentage was 30.7, while in another (Plymouth) it was only 15.8. In fact, by particular towns the percentage was as low as 2.6 in the case of Halifax, while it was as high as 60 per cent. in the case of Chilmark (on Martha's Vineyard Island), where 17 out of 28 children were reported as having defective vision. It is said in the report, however, that "these differences may represent actual differences in the children, or they may be due to differences in the conditions under which the tests were made, as in poorly lighted rooms, or to differences in the skill and care with which the tests were made." In other words, the differences may be due to the utter worthlessness of some of the examinations, and perhaps of most if not of all. It is not the right kind of a contribution to educational statistics, to furnish statistical data which can be variously interpreted as of the utmost significance on the one hand, or of no significance whatever on the other.

For reasons which require no extended consideration, it may safely be expected that astigmatism and impaired visual power should increase with increasing age, or from the lower to the higher grades. It is, therefore, of importance, that statistical returns as to visual strength and astigmatism should be tabulated in this manner and not given in the form of aggregates inclusive of children from the lowest to the highest school ages. In fact, the element of age, is almost generally neglected in the statistical returns of boards of education on defective vision, and for that matter, with regard to all other physical and mental defects and infirmities.

Defective or abnormal vision is merely one of many important physical aspects of school life which have a direct relationship to school attendance. Eyestrain, unquestionably, is the underlying cause of a vast amount of ill-health, not only during youth but during middle life and even old age. Eyestrain is responsible for many of the so-called educational failures, or backward children. What is true of defective vision is more or less true of all other physical defects, chiefly defective hearing, adenoid growths, enlarged tonsils, defective methods of breathing, defective circulation, etc. However difficult it may be to take these factors into consideration in the development of educational ideals, it would be folly to ignore them. Whether the subject is one of real economic importance in the administration of schools is secondary to the question as to whether the defective child itself can not be materially helped by the development of a rational policy of school supervision and more or less medical control. The authors of the report on medical inspection of schools are of the opinion that successful medical inspection results in indirect, and not in direct, financial economies. Considering, however, the largely unexplored field of physical and mental defects—their causes, cure, prevention, or amelioration—the accuracy of this conclusion may be seriously questioned. A school providing for full attendance and actually having an attendance of only 75 per cent. throughout the year, must obviously fall short of the fulfillment and economic realization of its purpose, even though the facts may not be statistically measurable or the results may not be indicated in dollars and cents. Personally, however, I am of the opinion that even from an economic point of view it would be possible, by means of accurate and comprehensive statistical data, to establish the close relationship between economical school administration and reasonably full school attendance. Or, in other words, I believe that it would *pay* the community to reduce absence and retardation to a minimum by intelligent medical and physical inspection of school children and to employ methods of sanitary control. Many other important questions concerning school management and its results require an answer, to which, however, at the present time, no accurate or conclusive answer can be made.

We require to know the amount of floor space per pupil as well as the amount of cubic space, for a defect in the former may not be disclosed by a statement of the latter.

We require more accurate and conclusive statistics on the question as to whether there is a direct relationship between school attendance and epidemic outbreaks of acute infectious diseases, which are certainly but inevitably fostered by school attendance, but which, through effective sanitary supervision and immediate infection can be brought within better control than is at present the case.

We require to know more definitely the actual temperature and air conditions in school rooms during the winter months, for it is practically certain that the large majority of school rooms are overheated and badly ventilated, with resulting conditions decidedly favorable to coughs and colds.

We need better mortality statistics of children at school, thoroughly analyzed according to causes and circumstances, to determine the extent to which deaths from diphtheria, scarlet fever, and whooping cough are directly traceable to school infection.

We require a more precise distinction in school statistics between elementary, secondary, and high schools, and we also are urgently in need of more ample statistics for private schools, which are practically ignored in most of the educational reports.

Much of the foregoing information is of the greatest practical importance in that it forms the basis for an accurate knowledge of the child's life in its relation to future growth and development. The modern principles of child-labor legislation and factory hygiene emphatically suggest the utility of a correct statistical basis for measures which react powerfully upon the community, and which, unfortunately, often miscarry because of ignorance and misunderstanding concerning the fundamental principles which should underlie social legislation. It has been said, and with much truth, that the time and energy of teachers should be given to instruction rather than to the compilation of statistics. Unquestionably the teaching function should come first; but the statistical function, or the faithful recording of certain essential facts, is as much a part of a teacher's duty as similar requirements are of doctors, who, in the midst of their arduous labors, must communicate essential facts to municipal or state boards of health, or other authorities. No one whose profession or function in life involves the discharge of public or semi-public duties can avoid the necessity of faithfully recording facts which are essential to the efficient administration of a rational system of governmental policies. It is not, however, that teachers object to the recording or collecting of useful statistical information, but that they are opposed to the making of reports which are obviously useless and which can never be made to serve a proper and legitimate governmental or public purpose. It is not so much a question of statistics, as such, as it is of statistical information of the right kind, that confronts the teacher, and there can be no doubt that whatever is legitimate, rational, and useful in the way of information concerning the pupil, will be cheerfully supplied by the large majority, who have the best interest of the child at heart.

There is little hope of a substantial reform in our educational statistics until the Bureau of Education of the United States Government is adequately and properly provided with a statistical force in conformity to the administration of educational departments abroad. Educational statistics are much more complicated and involved than vital statistics, to which the municipalities, states, and the Federal Government give such very serious attention. Certainly the children, who are properly called "the best asset of the Nation," are entitled to the fullest consideration in this respect, and there is little doubt but that, if once the importance of the subject is fully realized, the United States will take a position in this respect which will place it fully on a par with other truly civilized nations of the earth.